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A GUM-INDUCING DIPLODIA OF PEACH AND ORANGE

H. S. FAWCETT AND O. F. BURGER

A species of *Diplodia* has been isolated in pure cultures from both peach trees and orange trees in Florida, and by inoculation tests has been shown to produce copious gumming on healthy individuals of these hosts.

This species was first obtained from the interior of gumming peach branches on July 14, 1910; and the usual methods were employed to secure pure cultures free from possible bacteria or associated fungi. The same fungus was afterwards isolated from specimens of gumming peach branches from five different localities in five counties of Florida. The two most widely separated localities were West Tampa and Pensacola, about 350 miles apart. A fungus which appears identical with this was isolated from gumming orange branches on September 3, 1910, and it has since been isolated from diseased orange limbs and decaying orange fruits from ten different localities, in six counties.

In all, ten series of inoculations covering a period of five months have been made on peach and orange trees; five series by introducing pure cultures of the *Diplodia* isolated from the peach into peach trees; three series by introducing pure cultures, isolated from orange, into orange trees; and two series of cross inoculations by introducing the peach *Diplodia* into orange trees and the citrus *Diplodia* into peach trees. The peach trees used for these inoculations were about two years old, and the orange trees one to three years old. They were growing in pots in the greenhouse. In most of these inoculations the bark was cut through with a sharp scalpel, a bit of fungus mycelium inserted, and the inoculated portion wrapped in oiled paper and tied with raffia. A few inoculations were made without cutting the bark. Check trees, cut and wrapped in the same way, but not inoculated, were kept in every case.

Every peach tree on which the bark had been cut and a bit of fungus inserted, began to gum in from four to seven days, the tissue near the point of inoculation gradually dying. In no case were any of the trees killed; but in one instance the cambium on one side of the stalk was killed to a distance of seven and one half inches from the inoculated point, and pycnidia of the *Diplodia* were produced along the deadened area sixteen days after the inoculation. In most cases the gum oozed out in tough, irregular masses one half to three fourths of an inch across, and remained attached, not only at the point of inoculation, but at other points on the bark. In one instance a mass of gum was formed six inches from the point of inoculation. One inoculation was made by slightly scraping the outer bark and placing on it a bit of mycelium. In this case gumming also occurred. Other inoculations were made by placing bits of the mycelium in contact with uninjured bark of different ages. Where the twigs were tender and green, gum was induced, but where branches were older no infection took place.

In no case did the check trees exude any gum, and the cuts which had been made gradually healed up in the normal way.

Orange trees were also inoculated, in the same manner as described for the peach trees, with cultures isolated from citrus trees. In nearly every case a flow of gum was produced, which was more watery than that of the peach, but in time hardened into large tear-like drops below the point of inoculation.

The orange trees kept as checks, which had been cut and wrapped in the same way as the inoculated trees, failed in every instance to produce gum, and the cuts gradually healed up in the regular way.

Cross inoculations were finally made in which the peach *Diplodia* was introduced into cuts in orange trees, and the citrus *Diplodia* was introduced into cuts in the bark of peach trees. The result was that gumming was produced in every case, in the same way as previously described.

Cultures of this fungus were again isolated from these inoculated peach and orange trees, and these cultures showed the same features of growth as those from which the inoculation had been made. As far as known to the writers, this is the first time that

any of the species of *Diplodia* have been shown to produce gumming in trees.

The same fungus was also isolated a number of times from rotting fruits of orange and of grapefruit. It was shown by further inoculation experiments that the fungus was able to cause softening and decay of various fruits. Oranges, lemons and apples after being inoculated with a bit of the mycelium, softened in from one to two weeks. It was only necessary to place the fungus on the stalk end of picked lemons and oranges to produce decay, after which the fungus could be isolated from the interior of the fruits.

In looking up literature on *Diplodia*, our attention was called to recent inoculation experiments by I. B. Pole Evans in the Transvaal, in which he had shown that a *Diplodia* was the cause of decay in lemons and other citrus fruits. An examination of the description of this fungus by I. B. P. Evans, in Science Bull. No. 4 of the Transvaal Department of Agriculture, appears to show that the Florida *Diplodia* on peach and citrus may be the same as *Diplodia natalensis* Evans. Specimens were examined by Mrs. Flora W. Patterson, mycologist at the U. S. Department of Agriculture, who reported that the microscopic morphology of the citrus fungus agreed quite well with the descriptions of Evans' species. Further study and a comparison of cultures of the two fungi will, however, be necessary to determine this point. A more detailed description of these inoculation experiments, and of the cultural characters of this gum-inducing and fruit-rotting fungus will be published later.

UNIVERSITY OF FLORIDA,
GAINESVILLE, FLA.